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Turmeric

Curcuma longa

Family: Zingiberaceae

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By

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Introduction

The traditional spice and medicine turmeric (*Curcuma longa*, formerly *C. domestica*) is a low-growing perennial with lanceolate (sword-shaped) leaves and yellow flowers.^{1,2} Native to Southeastern Asia, turmeric is currently cultivated in India, China, Japan, Indonesia, Taiwan, Africa,³ Bangladesh, Sri Lanka, Burma (Myanmar), Thailand, Cambodia, Malaysia, and the Phillipines.² India is by far the largest consumer, producer, and exporter of turmeric rhizome (lateral fleshy roots), and the country also exports turmeric essential oil, turmeric oleoresin, and turmeric preparations.⁴ The rhizomes are dried and ground into a golden yellow powder used in cooking and medicine.^{1,2,3} They have a distinctive earthy fragrance.⁵

History and Cultural Significance

The genus name *Curcuma* is the Latinized form of the Arabic *al-kurkum*, which originally meant *saffron* but now refers exclusively to turmeric. The common name, turmeric, comes from the French *terra-mérite* (Latin *terra merita*), meaning meritorious earth—probably because ground turmeric resembles the earth pigment ochre, and perhaps because of the regard in which turmeric was held by ancient peoples. In many languages, the name for turmeric means yellow root, and it is known as Indian saffron in many European languages, although it is a cheap and unacceptable substitute for true saffron (*Crocus sativus*, Iridaceae).^{6,7} Known as the “golden spice” or the “spice of life,” turmeric has been held sacred and used medicinally in India for 4000 – 6000 years.^{2,6} During India’s Vedic period (ca. 1500 – 600 BCE), the orange-yellow rhizome of turmeric was called the “herb of the sun” and was regarded as the most outstanding healing herb.²

Turmeric is widely used in the Indian systems of medicine (Ayurveda, Siddha, and Unani) as well as in Eastern Asian systems (Traditional Chinese Medicine [TCM], Japanese Kampo, Korean, and Malay). In the Ayurvedic system, depending on what it is combined with, turmeric’s main therapeutic uses are for treating disorders due to poison, ulcers, skin diseases and urticaria, urinary disorders, anemia, and chronic rhinitis/sinusitis.⁸ It is also used in Ayurveda for anorexia, cough, diabetic wounds, biliary and liver disorders, and rheumatism.² Many Ayurvedic healers integrate the powder into a paste or lotion for the treatment of dry and flaking skin, skin sores and wounds, external inflammations, and painful arthritis.^{1,2,9} In the Unani system, turmeric is used therapeutically to treat ulcers, rheumatoid arthritis, conjunctivitis, eye strain, hiccup, asthma, catarrh, and itching.¹⁰

Traditional medicinal practices in India and China tout the benefits of this bitter-tasting and slightly fragrant root as a digestive aid.¹¹ In TCM, turmeric is specifically indicated for treatment of amenorrhea (absence of menstrual periods), mass formation in the abdomen, rheumatic pain of the shoulders and arms, traumatic swelling and pain, and pricking pain in the chest and abdominal regions.¹²

Turmeric is incorporated into teas and is a base component in many culinary spice blends, specifically curry.^{1,3,6} It is a component in *kedgeree* and *piccalilli* (England), *sofrito* (Africa), and *la-kama* (Morocco).¹³ The fresh rhizome is preferred in Thailand, where it is grated and added to curry dishes and yellow curry paste.⁶ Yellow rice, made by the addition of fresh or dried turmeric, is a dietary staple on the Eastern islands of Indonesia; in Bali, yellow rice is used as an offering to the Hindu deities. Turmeric has also become a staple in Ethiopian cuisine.^{5,13} Turmeric essential oil is used to improve the taste of stomach bitters, and the oleoresin is used in the food industry in sauces, soups, and instant meals.¹³ Because of its brilliant color, turmeric has also been traditionally employed as a dye to color not only foods but cosmetics, paper, wood, and fabrics, specifically the golden robes worn by Thai Buddhist monks.⁹

Storing turmeric in its whole rhizome state is preferable as flavor and aroma

dissipate quickly once the rhizome is powdered.¹³ However, powdered turmeric has an almost unlimited life as a dye.

In 1985, the German Commission E approved turmeric for the internal treatment of indigestion.¹ The European Scientific Cooperative on Phytotherapy (ESCOP) recommends turmeric for mild digestive disturbances and minor biliary dysfunction.¹⁴ In 2008, the European Medicines Agency (EMA) published a draft monograph, which once final, will be relevant for traditional herbal medicinal product (THMP) registrations in all EU Member States, including Germany. It proposes therapeutic indications for “preparations” of turmeric (e.g., powdered rhizome, herbal tea, and 1:10 tincture with 70% ethanol) for the symptomatic relief of dyspepsia.¹⁵ Also in 2008, Health Canada published its final monograph for turmeric for the purpose of natural health product (NHP) compendial product license applications. Health Canada approved uses of the dried rhizome or preparations of the rhizome (e.g., herbal tea infusion, 1:1 fluidextract and/or 1:5 tincture) as a carminative to help relieve flatulent dyspepsia and as a digestive aid.¹⁶ Official quality standards are available in the currently valid editions of the *United States Pharmacopeia*, *British Pharmacopoeia*, *European Pharmacopoeia*, *Mexican Herbal Pharmacopoeia*, *Japanese Pharmacopoeia*, *Korean Herbal Pharmacopoeia*, *Pharmacopoeia of the People’s Republic of China*, *Ayurvedic Pharmacopoeia of India*, *Unani Pharmacopoeia of India*, and others. Based on centuries of use as a common spice and modern toxicological research, turmeric and curcumin are generally recognized as safe (GRAS) for use in foods and dietary supplements.

Turmeric has been suggested as a safe, natural, and effective alternative to now-recalled cyclooxygenase inhibitors like celecoxib (Celebrex®) and rofecoxib (Vioxx®), as well as aspirin and ibuprofen.^{1,17}

Modern Research

Curcumin, a collective noun for a group of phenolic compounds called curcuminoids, is the most active chemical component in turmeric; it accounts for 2-5% of the spice and is responsible for its characteristic yellow color.² Extensive *in vitro* and *in vivo* research over the past 50 years has indicated that curcumin may be helpful in a wide variety of conditions and diseases. It has demonstrated antioxidant, anti-inflammatory, hepatoprotective, anti-mutagenic, anticarcinogenic, antitumor, antibacterial, fungistatic, and wound-healing properties, among others.^{2,13}

Clinical studies show that curcuminoids may be beneficial in the prevention and treatment of a number of types of cancer, including breast, colorectal, gastrointestinal, genitourinary, lung, leukemia, lymphoma, melanoma, ovarian, pancreatic, prostate, and sarcoma.¹⁸⁻³⁰ Treatment with encapsulated turmeric in one clinical study resulted in the alleviation of peptic ulcers.³¹ A pilot study of 207 volunteers suffering from irritable bowel syndrome (IBS) suggested that a standardized turmeric extract (Cynara™ Turmeric, Lichtwer Pharma (UK) Ltd., Marlow, UK) might help reduce IBS symptoms, although placebo-controlled trials were needed.³² A short-term study investigating the anti-

rheumatic activity of curcumin found that its effects were comparable with those of phenylbutazone, an analgesic and anti-inflammatory drug.³³ Curcuminoids were also shown to produce a better anti-inflammatory response than placebo in postoperative inflammation in a small group of males who had hernia operations.³⁴ A pilot study suggested that turmeric paste applied externally is an effective and inexpensive treatment for scabies, a condition caused by skin mites.³⁵ Curcumin also shows beneficial effects on insulin resistance, a precursor of type 2 diabetes.³⁶ Turmeric extract has shown some potential in prevention and treatment of neurodegenerative conditions, including Alzheimer's disease.³⁷ Other clinical trials suggest that curcumin might be helpful in treating familial adenomatous polyposis, ulcerative colitis, hypercholesteremia, atherosclerosis, pancreatitis, psoriasis, chronic anterior uveitis, and arthritis.²⁸

Turmeric has also shown promise in combination with other herbs. In one study, a combination of turmeric and Indian tinospora or *guduchi* (*Tinospora cordifolia*, Menispermaceae) was given to tubercular patients who were also receiving a treatment known to cause liver toxicity. That study found that the incidence and severity of hepatotoxicity was significantly lower.³⁸ Turmeric showed clinically significant results when studied in combination with Indian frankincense (*Boswellia serrata*, Burseraceae) for osteoarthritis of the knee.³⁹ Another clinical trial tested an eye drop preparation made from extracts of turmeric and 7 other herbs from the Ayurvedic tradition on patients with a number of ophthalmic disorders.⁴⁰ The herbal eye drop was successful in a variety of the conditions and no adverse effects were observed. Research demonstrates that the oral bioavailability of curcumin is limited and is enhanced by combining it with piperine, a compound found in black pepper (*Piper nigrum*, Piperaceae) and long pepper (*P. longum*).⁴¹

Future Outlook

In 2007, India accounted for over 71% of turmeric exports worldwide, followed by Vietnam (4.6%), China (2.7%), and Bangladesh (2.0%).⁴² India exported no more than 10% of its annual production of 527,980 tons in 2002-2003. As of 2007, India had 162,950 hectares (402,658 acres) committed to turmeric cultivation with a production of 552,300 tons. In the most recently reported 12-month export trade data (April 2007 through March 2008), India exported 11,611.44 metric tons of fresh turmeric rhizome valued at USD \$8.23 million and 42,380.57 metric tons of dried and/or powdered rhizome, valued at USD \$33.95 million.⁴³ During the same period, India also exported 355,930 kg of turmeric oleoresin, 54,660 kg turmeric preparations, and 1,360 kg of turmeric essential oil.

Turmeric is susceptible to disease that can lead to a reduction in yield by as much as 80%.² It is also susceptible to abruptly fluctuating prices due to changing trade relations and competing turmeric production in a number of countries. Since a sustainable turmeric economy is only possible when these risks are minimized, a number of policy measures are being considered in turmeric-producing countries, including healthy seed production, quarantine

regulations to restrict transporting seed from one state to another when disease is a problem, and education of farmers regarding post-harvest technology and the importance of keeping varieties separate since Alleppey and Madras turmeric are considered to be of higher quality than some others.^{2,13}

—Gayle Engels

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